

What is claimed is:

1. An orienting method for an optical polymer film,  
said polymer film being oriented after passing through  
at least one processing bath containing a fluid, said  
5 orienting method comprising a step of:

removing the fluid, which exists on said polymer  
film, by using a draining member within 10 seconds from  
the moment that said polymer film has left said processing  
bath.

10 2. An orienting method for an optical polymer film  
according to claim 1, wherein said draining member is  
disposed at an exit of at least the first processing bath  
when there are the plural processing baths.

3. An orienting method for an optical polymer film  
15 according to claim 1, wherein said draining member is  
disposed at an exit of at least the last processing bath  
when there are the plural processing baths.

4. An orienting method for an optical polymer film  
according to claim 1, wherein said processing baths  
20 include a cleaning bath for cleaning said polymer film,  
a dyeing bath for dyeing said polymer film, and a hardening  
bath for hardening said polymer film.

5. An orienting method for an optical polymer film  
according to claim 4, wherein said polymer film is oriented  
25 in a pneumatic atmosphere after passing through said  
cleaning bath, said dyeing bath, and said hardening bath  
in order.

6. An orienting method for an optical polymer film according to claim 1, wherein said polymer film is a polyvinyl alcohol film.

7. An orienting method for an optical polymer film,  
5 comprising the steps of:

cleaning the strip-form polymer film with a cleaning fluid contained in a cleaning bath through which said polymer film continuously passes;

removing said cleaning fluid existing on both  
10 surfaces of said polymer film, with first draining blades disposed near a film exit of said cleaning bath;

dyeing said polymer film with a dyeing fluid contained in a dyeing bath through which said polymer film continuously passes;

15 removing said dyeing fluid existing on both surfaces of said polymer film, with second draining blades disposed near a film exit of said dyeing bath;

hardening said polymer film with a hardening fluid contained in a hardening bath through which said polymer  
20 film continuously passes;

removing said hardening fluid existing on both surfaces of said polymer film, with third draining blades disposed near a film exit of said hardening bath; and

orienting said hardened polymer film in the air.

25 8. An orienting apparatus for an optical polymer film, said polymer film being oriented in a pneumatic atmosphere after passing through at least one processing

bath containing a fluid, said orienting apparatus comprising:

a draining member for removing the fluid existing on said optical polymer film, said draining member being  
5 disposed near a film exit of said processing bath.

9. An orienting apparatus for an optical polymer film according to claim 8, wherein said draining member includes one of a draining roller and a draining blade.

10. An orienting apparatus for an optical polymer  
10 film according to claim 9, wherein said processing baths include a cleaning bath for cleaning said polymer film, a dyeing bath for dyeing said polymer film, and a hardening bath for hardening said polymer film.

11. An orienting apparatus for an optical polymer  
15 film according to claim 10, wherein said polymer film is a polyvinyl alcohol film.

12. An orienting apparatus for an optical polymer film, comprising:

a cleaning bath for cleaning the strip-form polymer  
20 film with a cleaning fluid;

a first draining blades disposed near a film exit of said cleaning bath, said first draining blades removing said cleaning fluid existing on both surfaces of said polymer film;

25 a first rubber-roller pair disposed between the film exit of said cleaning bath and the first draining blades, said first rubber-roller pair nipping said polymer film

and preventing said cleaning fluid from dripping therefrom;

a dyeing bath for dyeing said polymer film with a dyeing fluid;

5 a second draining blades disposed near a film exit of said dyeing bath, said second draining blades removing said dyeing fluid existing on both surfaces of said polymer film;

a second rubber-roller pair disposed between the film  
10 exit of said dyeing bath and the second draining blades, said second rubber-roller pair nipping said polymer film and preventing said dyeing fluid from dripping therefrom;

a hardening bath for hardening said polymer film with a hardening fluid;

15 a third draining blades disposed near a film exit of said hardening bath, said third draining blades removing said hardening fluid existing on both surfaces of said polymer film;

a third rubber-roller pair disposed between the film  
20 exit of said hardening bath and the third draining blades, said third rubber-roller pair nipping said polymer film and preventing said hardening fluid from dripping therefrom; and

a tenter apparatus for orienting said hardened  
25 polymer film in the air.

13. An orienting apparatus according to claim 12, wherein said first through third draining blades

respectively include a front blade for contacting with the front of said polymer film, and a back blade for contacting with the back of said polymer film, said front blade and said back blade being disposed at different positions in a conveyance direction of said polymer film.

14. An orienting apparatus according to claim 13, wherein said front blade and said back blade have a toe formed in an arc shape whose radius is 0.1 to 1 mm, and surface roughness of the toe is 5S or less.

15 15. An orienting apparatus according to claim 14, wherein said first through third rubber-roller pairs have hardness of 50 degrees to 90 degrees and surface roughness of 0.5S to 10S, and linear pressure of nip thereof is 100N/m to 500N/m.

15 16. A tenter apparatus in which a strip-form polymer film, both side edges of which are held by openable clampers, is conveyed along a first rail and a second rail to stretch a width thereof, said tenter apparatus comprising:

20 gripping-force aid means for applying a force in a closed direction of said clasper, said gripping-force aid means being disposed within a range running from a grip commencement position of the clasper to a grip release position of the clasper.

25 17. A tenter apparatus according to claim 16, wherein orienting areas for performing plural sorts of orientation are formed between said first rail and said

second rail, said gripping-force aid means being disposed within at least one of said orienting areas.

18. A tenter apparatus according to claim 16, wherein said first rail and said second rail include a linear  
5 portion and a curving portion bending in an arc shape, said gripping-force aid means being disposed in front and in rear of said curving portion.

19. A tenter apparatus according to claim 16, wherein said gripping-force aid means is disposed at a position  
10 prior to thermal processing.

20. A tenter apparatus for stretching a width of a strip-form polymer film, comprising:

a plurality of clips movable in a closed direction and an open direction, said clip gripping a lateral end  
15 of said polymer film when moving in the closed direction, and said clip releasing the lateral end of said polymer film from a grip when moving in the open direction;

first and second endless moving means oppositely disposed, the respective endless moving means holding  
20 said clips at predetermined intervals and moving at a constant speed;

first and second rails disposed in association with said first and second endless moving means so as to form a conveyance passage of said polymer film, said first  
25 and second rails defining a movement locus of the respective clips when the respective clips are moved by said first and second endless means in a conveyance

direction of said polymer film, gripping the lateral end  
of said polymer film; and

gripping-force aid means disposed somewhere along  
said movement locus defined by said first and second rails,  
5 said gripping-force aid means pressing the respective  
clips in the closed direction to increase a force for  
gripping said lateral end.

21. A tenter apparatus according to claim 20, wherein  
said conveyance passage of the polymer film has an entrance  
10 portion, a midway portion for orienting said polymer film,  
and an exit portion;

said first rail and said second rail are parallel  
at the entrance portion and the exit portion;

a width of said exit portion is wider than a width  
15 of said entrance portion, and said exit portion inclines  
relative to said entrance portion;

an inclination of said first rail relative to said  
entrance portion is larger than that of said second rail  
at a former half of said midway portion; and

20 said first rail connects in a first arc of a larger  
arc-angle and said second rail connects in a second arc  
of a smaller arc-angle, at a latter half of said midway  
portion and said exit portion.

22. A tenter apparatus according to claim 21, wherein  
25 said clip comprises:

a U-shaped frame having a holding surface on which  
a side edge of said polymer film is placed; and

a flapper rotatably attached to said frame, said polymer film being held by a bottom surface of said flapper and said holding surface of said frame.

23. A tenter apparatus according to claim 22, wherein  
5 said gripping-force aid means comprises:

a close cam for coming into contact with an upper end of said flapper to press said flapper in the closed direction;

a shaft having a first-end side to which said close  
10 cam is attached;

a bearing for supporting said shaft in a slidable manner;

a stopper attached to a second-end side of said shaft;  
and

15 a spring disposed between said bearing and said stopper, said spring adjusting a force of said close cam for pressing the upper end of said flapper.

24. A tenter apparatus according to claim 23, wherein  
20 said gripping-force aid means is disposed in said midway portion and said close cams are arranged along said first and second rails.

25. A tenter apparatus according to claim 24, wherein  
said close cams are disposed at positions corresponding to said first and second arcs.

25 26. A tenter apparatus according to claim 25, wherein  
said polymer film is heated at the entrance portion and the midway portion in order to easily perform orientation.